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Mission Driven

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MISSION

Rural, poor, and remote. Water resources in fields where livestock roam. Wells uncovered, the final resting places for wildlife. Dishes washed in buckets, then placed on the ground to dry, recontaminating clean plates, forks, and cups.

DRIVEN

BY SANDRA (WELCH) HARNER '64

Vacas, Bolivia, has seen its share of water-borne disease. This agricultural village in South America has been the focus of Cedarville engineering-driven missions trips since 2014. But Vacas, and places like it, has also inspired and motivated a brand-new major at Cedarville — civil engineering.

A CIVIL SOLUTION

When it comes to troubling concerns regarding water, Vacas is not alone. According to DoSomething.org, more than 884 million people in the world lack access to safe water supplies. More than 840,000 people die each year from water-related disease. Almost two in three people who need safe drinking water survive on less than $2 a day. In many developing countries, millions of women spend several hours a day collecting water from distant, often-polluted sources. Every minute, a child dies of a water-related disease.

Thousands of mothers, fathers, sons, and daughters are dying from the deadly water they drink every day. The need for clean water is obvious. And providing for the least of these is a biblical mandate. But to treat a systemic problem, you need more than "give-a-man-a-fish" solutions. It requires long-term strategies. It takes civil engineering.

It is this mission that served as the catalyst for Cedarville University to offer a civil engineering major, beginning fall 2018. "We've been discussing this dream for 12 to 15 years because we knew that once we started to do missions work out of this country, in Africa and now in South America, that a lot of the work students were doing was really civil engineering work," explained Robert Chasnov, Dean of the School of Engineering and Computer Science.

"We saw the need for the developing countries we were working with to have clean water systems, correct disposal of waste water systems, energy systems that are mainly generator-based electricity onsite, roadway construction, and bridges."

> "I've seen when you work toward the tangible means of helping people in their life, it opens doors to other conversations and gives you the opportunity to share the Gospel." – Stephen Ayers

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But civil engineering is more than just clean water — it's about infrastructure. It's about fundamental facilities and systems that serve a country or city, including the services and facilities necessary for its economy to function. It involves technical structures such

Pictured on previous page on a 2017 engineering missions trip to Vacas, Bolivia (from left to right) are Silas Welsh '18; Austin Ballentine '19; Ellen Thompson; Tom Thompson, Professor of Mechanical Engineering; Valerie Martin '18; and Nate Wiggins '17.

"Churches in Vacas are growing because of this project. That's what I want to do in the future, wherever the Lord wants to take me." – Anna Parkinson '18

as roads, bridges, tunnels, water supply, sewers, electrical grids, and telecommunications.

Even still, finding and delivering clean water is often one of the most pressing civil engineering challenges in places like Vacas.

Anna Parkinson '18 traveled to Vacas on a missions trip the summer after her sophomore year. There, her team ministered to people who did not have clean water.

"The people lived in homes with no heating, running water, or utilities," she recalled. "The missionary working there, Dale Harlan, is a civil engineer. He worked with the community to install pumps, which the villagers paid for in part, and the mission organization paid the rest. The people learn how to build their own pumps and dig their own wells, so they can maintain them on their own. They had a sense of ownership."

Parkinson and the Cedarville team, led by Fred Harmon, Associate Professor of Electrical Engineering, surveyed the existing pumps and made repairs and changes that would make the pumps more functional and easier to use.

"My passion has always been to go overseas and share the Gospel by working on water problems," she said. "It was so rewarding to help make that a reality in Bolivia."

BUILT BY FAITH

To fulfill the dream of a civil engineering major at Cedarville University, the School of Engineering and Computer Science hired Stephen Ayers as its inaugural civil engineering professor. Previously,

he was chair of the engineering department of LeTourneau University in Longview, Texas, where he also taught civil engineering courses.

Prior to that, he worked as a research engineer in Australia, developing new products for the structural engineering market using advanced composite materials. For the past six years, Ayers has worked in various villages in Senegal, Africa, developing water resource projects. His focus has been on tailoring engineering solutions to the environment in Senegal.

Ayers' firm belief in Christian higher education and missions focus made him a perfect fit for Cedarville. "I saw what God could do through technical education that was founded in Christian ideals," he explained. "After visiting Cedarville's campus for a Christian engineering conference, my wife and I got the idea that God was calling us to a new stage. And when the job at Cedarville came up, my wife read the job ad with me and said, 'This is you.' It seemed like a good fit."

He was drawn to the clarity of the University's Christian mission, as well as its already-strong mechanical and electrical engineering programs and strong emphasis in math and science. "All the foundational pieces were in place," he said. "I saw that we could build on that with civil engineering."

In addition to these foundational pieces, civil engineering students will choose four concentrations and two specializations from the following:

- Construction Engineering and Management
- Construction Materials Engineering
- Environmental Engineering
- Geotechnical Engineering
- Structural Engineering
- Transportation Engineering
- Water Resources Engineering

Through laboratory experiences, design competitions, and internships, students will gain valuable real-world experience as they pursue their engineering degrees. "You can stay in the U.S. with your license and get a job, but if your heart calls you to go to the missions field, we've given you a skill set that enables you to go and make a difference," Ayers said.

"I've seen when you work toward the tangible means of helping people in their life, it opens doors to other conversations and gives you the opportunity to share the Gospel."

And for Parkinson, who has since taken an engineering job with a well design and hydrology technology company near Seattle, Washington, that's the part that pumps her up the most. "It was cool to see engineering put into practice in a missionary context," she said. "I couldn't speak the language, but I could do something that was impactful, which opened doors for the Gospel. Churches in Vacas are growing because of this project. That's what I want to do in the future, wherever the Lord wants to take me."

Sandra (Welch) Harner '64 *is Senior Professor Emerita of Technical Communications at Cedarville University.*

From left to right: Samuel Thompson '18; Blake Lasky '18; Stephen Ayers, Professor of Civil Engineering; and Phillip Maillefer '21 work on a civil engineering project. Maillefer will be one of the inaugural civil engineering majors this fall.